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EXAMINER	
HO, CHUONG T	

ART UNIT	PAPER NUMBER
2616	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/673,055	DOSHI ET AL.	
	Examiner	Art Unit	
	CHUONG T. HO	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 July 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-11,13 and 15-17* is/are rejected.

7)☒ Claim(s) *7,12 and 14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *05/16/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The amendment filed 07/19/07 have been entered and made of record.

2. Applicant's arguments with respect to claims 1-17 have been considered but are moot in view of the new ground(s) of rejection.

3. Claim 1-17 are presented for examination.

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 05/16/07; is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 3-6, 8-9, 13, 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishibashi et al. (U.S.2003/0147352 A1) in view of Sinha (U.S.Patent No. 6,904,462).

As to claim 1, Ishibashi et al. discloses a system for determining a restoration path corresponding to a primary path (301, 302) for a new service in a mesh network (page 1, [0004], multi-protocol label switching technology in a mesh network) having a plurality of nodes (figure 16, ABCDEF) interconnected by a plurality of links (figure 16, G1...G7), the system comprising:

For each of plurality of candidate restoration paths (figure 16, 311 for 301, 312 for 302) associated with the primary path;

Determining whether the primary path requires any additional restoration bandwidth ([0144], the 1:1 or shared-type protection paths can be distinguished from each other for separate management by the different amounts of reserved bandwidth as given by the following relations ([0145] [0146], shared protection bandwidth, bandwidth reserved for protection path) required any additional restoration bandwidth to be reserved on any link of the candidate restoration path based on whether, for each link of the candidate restoration path, the primary path (figure 16, 301) is SRLG-disjoint from each other primary path (302) that is currently protected by that link ([0148], the working and protection TDM paths 301, 311 have a bandwidth of STS-1 and the working and protection TDM paths 302, 312 have bandwidth of STS-3. The extra traffic path 303 has a bandwidth of STS-1 which occupies a portion of the STS-3 bandwidth the shared-type protection path 312);

A shared risk link group (SRLG) (page 6, [0079], SRLG (shared risk link group) of a working path that forms a pair with the requested protection path) is set of two or more links, for which a failure of any one link in the SRLG is associated with a relatively high risk of failure of the other links in the SRLG ([0006], In a GMPLS network, a list of SRLG identifiers is maintained for each link of the network that belongs to the SRL groups of the list. Two paths are the to be SRLG-disjoint if their links belong to different sets of shared risk link groups in each of which any one of the links do not overlap any one of

the other group. If one of the SRL groups fails, the SRLG-disjoint paths never fail simultaneously);

Two paths are SRLG-disjoint if no two links in the two paths are member of any one SRLG ([0008], when a path setup request is generated, the network calculates a pair of SRLG-disjoint working and protection paths. A signaling message is then transmitted through the network. In this process, bandwidth reservation is performed for both working and protection paths, figure 16).

However, Ishibashi et al. is silent to disclosing generating a path cost for the candidate restoration path, wherein the path cost is a function of whether any such additional restoration bandwidth is required.

Sinha discloses generating a path cost for the candidate restoration path, wherein the path cost is a function of whether any such additional restoration bandwidth is required; and selecting the restoration path for the new service based on the path cost for each candidate restoration path (see abstract, A link cost is determined based on a difference between the maximum proposed link vector element and the maximum link vector element. A path cost is determined for at least two protection paths based on a sum of link costs associated with a respective protection path. One of the at least two protection paths having the minimum path cost is selected to provide protection for the working path) (col. 5, lines 13-16, Referring to the example in FIG. 5, the path cost for protection path A-F-E is 10 representing the sum of the link cost for protection link e5 and the link cost for protection link e6. The path cost for new protection path A-H-E is 20) (col. 5, lines 19-22, Flow proceeds to step 218 where the protection path having the

lowest path cost is selected to provide protection for the defined working path. This minimizes the addition of new protection bandwidth. In the example shown in FIG. 5, protection path A-F-E has the lower path cost and thus is selected to protect the defined working path);

for each of a plurality of candidate restoration paths associated with the primary path (col. 1, lines 18-21): determining whether the primary path requires any additional restoration bandwidth to be reserved on any link or the candidate restoration path based on whether, for each link of the candidate restoration path (col. 2, lines 60-67); the primary path (figure 2, A B C D E) is SRLG-disjoint from each other primary path (figure 2, A G E) that is currently protected by that link (A F E) (A H E), wherein: a shared risk link group (SRLG) is a set of two or more links, for which a failure of any one link in the SRLG is associated with a relatively high risk of failure of the other links in the SRLG (col. 2, lines 50-55).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate generating a path cost for the candidate restoration path, wherein the path cost is a function of whether any such additional restoration bandwidth is required taught by Sinha into the system of Ishibashi. One would have motivated to do so to utilize minimum bandwidth usage is desirable to reduce cost of routing information at economy of scale.

4. As to claim 15, Ishibashi et al. discloses a system for determining a restoration path corresponding to a primary path (301, 302) for a new service in a mesh network (page 1, [0004], multi-protocol label switching technology in a mesh network) having a

plurality of nodes (figure 16, ABCDEF) interconnected by a plurality of links (figure 16, G1...G7), the system comprising:

For each of plurality of candidate restoration paths (figure 16, 311 for 301, 312 for 302) associated with the primary path;

Determining whether the primary path requires any additional restoration bandwidth ([0144], the 1:1 or shared-type protection paths can be distinguished from each other for separate management by the different amounts of reserved bandwidth as given by the following relations ([0145] [0146], shared protection bandwidth, bandwidth reserved for protection path) required any additional restoration bandwidth to be reserved on any link of the candidate restoration path based on whether, for each link of the candidate restoration path, the primary path (figure 16, 301) is SRLG-disjoint from each other primary path (302) that is currently protected by that link ([0148], the working and protection TDM paths 301, 311 have a bandwidth of STS-1 and the working and protection TDM paths 302, 312 have bandwidth of STS-3. The extra traffic path 303 has a bandwidth of STS-1 which occupies a portion of the STS-3 bandwidth the shared-type protection path 312);

A shared risk link group (SRLG) (page 6, [0079], SRLG (shared risk link group) of a working path that forms a pair with the requested protection path) is set of two or more links, for which a failure of any one link in the SRLG is associated with a relatively high risk of failure of the other links in the SRLG ([0006], In a GMPLS network, a list of SRLG identifiers is maintained for each link of the network that belongs to the SRL groups of the list. Two paths are the to be SRLG-disjoint if their links belong to different sets of

shared risk link groups in each of which any one of the links do not overlap any one of the other group. If one of the SRL groups fails, the SRLG-disjoint paths never fail simultaneously);

Two paths are SRLG-disjoint if no two links in the two paths are member of any one SRLG ([0008], when a path setup request is generated, the network calculates a pair of SRLG-disjoint working and protection paths. A signaling message is then transmitted through the network. In this process, bandwidth reservation is performed for both working and protection paths, figure 16).

However, Ishibashi et al. is silent to disclosing generating a path cost for the candidate restoration path, wherein the path cost is a function of whether any such additional restoration bandwidth is required.

Sinha discloses generating a path cost for the candidate restoration path, wherein the path cost is a function of whether any such additional restoration bandwidth is required; and selecting the restoration path for the new service based on the path cost for each candidate restoration path (see abstract, A link cost is determined based on a difference between the maximum proposed link vector element and the maximum link vector element. A path cost is determined for at least two protection paths based on a sum of link costs associated with a respective protection path. One of the at least two protection paths having the minimum path cost is selected to provide protection for the working path) (col. 5, lines 13-16, Referring to the example in FIG. 5, the path cost for protection path A-F-E is 10 representing the sum of the link cost for protection link e5 and the link cost for protection link e6. The path cost for new protection path A-H-E is

20) (col. 5, lines 19-22, Flow proceeds to step 218 where the protection path having the lowest path cost is selected to provide protection for the defined working path. This minimizes the addition of new protection bandwidth. In the example shown in FIG. 5, protection path A-F-E has the lower path cost and thus is selected to protect the defined working path);

for each of a plurality of candidate restoration paths associated with the primary path (col. 1, lines 18-21): determining whether the primary path requires any additional restoration bandwidth to be reserved on any link or the candidate restoration path based on whether, for each link of the candidate restoration path (col. 2, lines 60-67); the primary path (figure 2, A B C D E) is SRLG-disjoint from each other primary path (figure 2, A G E) that is currently protected by that link (A F E) (A H E), wherein: a shared risk link group (SRLG) is a set of two or more links, for which a failure of any one link in the SRLG is associated with a relatively high risk of failure of the other links in the SRLG (col. 2, lines 50-55).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate generating a path cost for the candidate restoration path, wherein the path cost is a function of whether any such additional restoration bandwidth is required taught by Sinha into the system of Ishibashi. One would have motivated to do so to utilize minimum bandwidth usage is desirable to reduce cost of routing information at economy of scale.

5. As to claim 3, Ishibashi discloses each candidate restoration path is SRLG-disjoint from the primary path)[0009], To seek a shortest path in GMPLS, use is made

of a route calculation algorithm known as CSPF (Constrained Shortest Path First) which applies the Dijkstra algorithm to a set of links that satisfy a set of constraints, such as SRLG disjoint between working and protection paths).

6. As to claim 4, Ishibashi discloses determining whether the link is part of an SRLG; and if the link is part of SRLG, then excluding nay path having a link in that SRLG from consideration as a candidate restoration path ([006], list of SRLG identifiers is maintained for each link of the network that belongs to the SRL groups of the list. Two paths are the to be SRLG-disjoint if their links belong to different sets of shared risk link groups in each of which any one of the links do not overlap any one of the other group).

7. As to the claim 5, Sinha discloses assigning a link cost to each link of each candidate restoration path; reducing the link cost by a factor R for each link of each candidate restoration path for which sharing is possible; generating a path cost for each candidate restoration path based on a sum of the link costs for the links of that candidate restoration path; and selecting one of the candidate restoration paths for the primary path based on minimum path cost (col. 2, lines 60-67, col. 3, lines 1-15).

8. As to the claim 6, Sinha discloses the factor R is a function of sharing degree for each link (col. 2, lines 60-67, col. 3, lines 1-15).

9. As to the claim 8, Sinha discloses wherein the link cost is also generated as a function of an administrative weight for the link (col. 4, lines 11-15).

10. As to the claim 9, Sinha discloses wherein the link cost is also generated as a function of a form of a sharing degree (col. 4, lines 11-15).

11. As to claim 13, Sinha et al. discloses the system is implemented for each of a plurality of candidate primary paths to generate a path cost associated with the candidate primary path and further comprising selecting one of the candidate primary paths for the new service (col. 2, lines 60-67, col. 3, lines 1-10, col. 4, lines 11-15).

12. As to claim 16, Sinha discloses where the network manager is distributed over the network (col. 2, lines 60-67, col. 3, lines 1-10, col. 4, lines 11-15).

13. As to claim 17, Sinha discloses where the network manager is located at a single node of the network (col. 2, lines 60-67, col. 3, lines 1-10, col. 4, lines 11-15).

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combined system (Ishibashi – Sinha) in view of Le Roux et al. (20070011284).

As to claim 2, the combined system (Ishibashi – Sinha) discloses the limitations of claim 1 above.

However, the combined system (Ishibashi – Sinha) are silent to disclosing wherein a failure of any one link in an SRLG is associated with a risk of failure of the other links in the SRLG greater than a specified risk threshold .

Le Roux et al. discloses wherein a failure of any one link in an SRLG is associated with a risk of failure of the other links in the SRLG greater than a specified

risk threshold ([0073], For this purpose, a Failure Risk or FR is defined as a link, a node or an SRLG. Naturally, for an SRLG, the actual risk of failure concerns the underlying physical resource but, for reasons of simplification, the SRLG will be associated with the physical resource in question.).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein a failure of any one link in an SRLG is associated with a risk of failure of the other links in the SRLG greater than a specified risk threshold taught by Le Roux into the combined system (Ishibashi – Sinha). One would have been motivated to do so to allow network resource are reserved on each of the links of the bypass tunnel in order to back up the said path in the event failure of the said element.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined system (Ishibashi – Sinha) in view of Swallow (U.S.Patent No. 7,099,286 B1)

As to claim 10, the combined system (Ishibashi – Sinha) discloses the limitations of claim 1 above.

However, the combined system (Ishibashi – Sinha) are silent to disclosing wherein the form of the sharing degree is an approximation to the sharing degree that is

calculated using a binary representation of a node link vector and a binary representation of a primary path node link vector, wherein the calculation of the approximation comprises: computing the bitwise AND of the binary representation of the node-link vector and the binary representation of the primary path node link vector.

Swallow discloses wherein the form of the sharing degree is an approximation to the sharing degree that is calculated using a binary representation of a node link vector and a binary representation of a primary path node link vector, wherein the calculation of the approximation comprises: computing the bitwise AND of the binary representation of the node-link vector and the binary representation of the primary path node link vector (Communication in a computer network involves the exchange of data between two or more entities interconnected by communication links and subnetworks. Entities concerned primarily with the correct routing of information in the network are called routers, to distinguish them from end systems which process traffic but do not take part in routing it. There are two fundamentally different approaches to the distribution and use of routing information in a network, called Distance Vector Routing and Link) (Implicitly in the provisioning operation is the notion of a Shared Risk Link Group (SRLG). SRLG is a relatively new concept that has been introduced to provide inputs necessary to plan for reliability in transport networks (see, for example, S. Chaudhuri et al., "Control of Lightpaths in an Optical Network", IETF Internet Draft, February 2000). A SRLG is a group of links that shat share a component whose failure causes the failure of all links of the group. The SRLG is associated with an entity at risk, typically a fiber span, and is a union of all links that ride on the fiber span. Links may traverse multiple

fiber spans, and thus be in multiple SRLGs. In order to identify SRLGs, links are tagged with a token which indicates a particular facility which is at risk of failure. For example, a particular conduit may have a token `45` and any circuit that passes through that conduit would carry the token `45` (among a possible long list of other tokens). All of the links that carry this token are part of a SRLG. When looking for backup routes, a route which is independent of any SRLG that is associated with the primary path is sought).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate wherein the form of the sharing degree is an approximation to the sharing degree that is calculated using a binary representation of a node link vector and a binary representation of a primary path node link vector, wherein the calculation of the approximation comprises: computing the bitwise AND of the binary representation of the node-link vector and the binary representation of the primary path node link vector taught by Swallow into the combined system (Ishibashi – Sinha). One would have been motivated to do so to find shared risk diverse paths.

18. As to claim 11, Sinha to disdclose wherein the sharability of a link in a candidate restoration path is represented by a sharing degree for the link, wherein the sharing degree is a maximum number of additional unit bandwidth primary services that can be added to the candidate primary without increasing restoration bandwidth reserved on the link(col. 2, lines 60-67, col. 3, lines 1-10, col. 4, lines 11-15).

Allowable Subject Matter

19. Claims 12, 14, 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cao (U.S.Patent No. 2003/0095500)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHUONG T. HO whose telephone number is (571) 272-3133. The examiner can normally be reached on 8:00 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ORGAD EDAN can be reached on (571) 272-7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EDAN O. ORGAD
SUPERVISORY PATENT EXAMINER
9/27/07

09/22/07